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On a New Variable in the Constellation Ara.

By J. Tebbutt, Esq.

I have recently been engaged in a re-examination and reduction of the stars compared by me with Comet III., 1862, with a view to the publication of my collected astronomical observations. The observations of that comet were made previously to the erection of my Observatory, and with a ring micrometer on my old telescope of 3¼ inches aperture, the instrument being mounted on an ordinary tripod without divided circles of any kind. The method which I adopted for the identification of the smaller comparison stars was to observe their transit, across either the ring or the field of the telescope, in conjunction with some star visible to the naked eye and differing but little from them in declination, the instrument, of course, remaining undisturbed in the interval. The bright star was then identified by sextant observations, and hence the approximate position of the small comparison star became known. It was in this way that I identified the stars *Brisbane* 5754 and 5799, compared with the comet on the evening of October 4, 1862, the bright star being about an hour of Right Ascension further east. The two stars were again compared with the bright one on the evenings of the 5th, 6th, and 9th, and the position of the latter carefully fixed on the last-mentioned date by means of sextant distances from θ *Scorpii*, *Altair*, *Antares*, and ε *Sagittarii*. These observations showed that the star was not to be found in the B. A. Catalogue, or even in the exhaustive one of Lacaille. My journal states that σ *Aræ* and this star were both visible to the naked eye, the latter being about a degree north-east of the former, and the brighter of the two. The journal also states that the star was of the fifth magnitude, and had a small round nebula to the north of it and in the same field of view. A careful reduction of the sextant observations from *Altair* and *Antares*, regard being had to mean refraction only, for temperature 50° and pressure 29·6 in., gives for the apparent place of the star on October 9, 1862, R.A = 17^{h} 29^{m} 6^{s}·60, N.P.D. = 135° 23′ 42″·8, which, reduced to the mean place for 1862·0, is R.A. = 17^{h} 29^{m} 2^{s}·51, N.P.D. = 135° 23′ 33″·8. Adopting + 4^{s}·415 and + 2″·69 as the annual precession in R.A. and N.P.D. respectively, I get the following as the mean position for the beginning of 1878:—R.A. = 17^{h} 30^{m} 13^{s}·15, N.P.D. = 135° 24′ 16″·8. There can be no doubt about the approximate position from the sextant observations from *Altair* and *Antares*, as it is verified by comparison with the observed distances from θ *Scorpii* and ε *Sagittarii*. Since the year 1862 my library has been enriched by various Catalogues, but I could not find in any of them a star position corresponding to the above. My curiosity being aroused, I turned the 4½-inch Equatoreal on the spot in the evening of the 13th instant, and was surprised to

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find that the field contained stars of the 10th and 11th magnitude only. One star in particular attracted my attention: it was extremely faint, and could only be observed with great difficulty. By clamping the lower circle I measured the difference of Right Ascension between this star and θ *Scorpii* and σ *Aræ*, the difference of North Polar Distance being obtained from the readings of the declination circle. These comparisons gave the following position for the faint star:—R.A. = $17^{\mathrm{h}}\ 30^{\mathrm{m}}\ 21^{\mathrm{s}}$; N.P.D. = $135°\ 23'$. The star was observed on the 13th, 14th, and 17th instant. Although there are several other faint stars within a few minutes of arc of this one, it is extremely probable that the star thus observed is identical with the star of the fifth magnitude by which the positions of *Brisbane* 5754 and 5799 were determined on the 4th, 5th, 6th, and 9th October 1862. The nebula seen in the same field of view with it is undoubtedly No. 3690 of Sir J. Herschel's Cape Catalogue for 1830. As the Variable is a remarkable one, I propose, when the Moon's absence allows the stars to be more readily seen, to record the positions of all the stars embraced in the same field of view.

Windsor, N. S. Wales,
November 21, 1877.

Improvements in a Solar Spectroscope, made by Mr. Grubb for Professor Young. By Wentworth Erck, Esq.

The usual practice in observing with the spectroscope, I believe, is to adjust the collimating and observing telescopes so as to render the incident and emergent pencils parallel for rays of mean refrangibility; and, on observing at either end of the spectrum, then to readjust the eye-piece of the observing telescope so as to render the emergent pencil parallel.

But this mode of procedure will not give the best definition, which requires that each pencil—that is to say, the pencil first incident on the first prism, as well as the pencil after dispersion—should be strictly parallel; and this adjustment of two variables can scarcely, so far as I am aware, be made while the spectroscope is in position.

Now, in the improved spectroscope alluded to, the collimating and observing telescopes are placed close together and parallel to each other, so that the observing telescope shall receive the rays after two internal total reflections.

In this position the eye-piece of the observing telescope and the collimating lens are coupled together by rack-work, so that both move together by turning one pinion; and thus, after the first adjustment, the two pencils are rendered strictly parallel for all parts of the spectrum.

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